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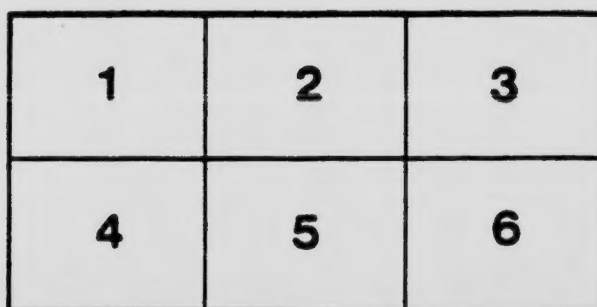
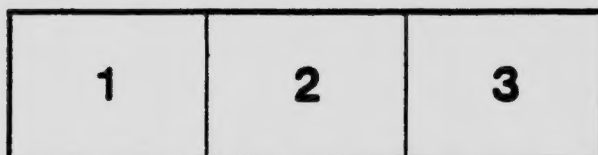
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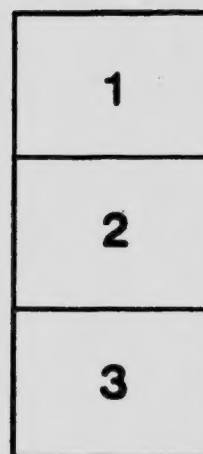
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LABORATORY
OF THE
INLAND REVENUE DEPARTMENT
OTTAWA, CANADA.

1901.

BULLETIN No. 77.

EFFERVESCENT SODIUM PHOSPHATE.

LABORATORY
OF THE
INLAND REVENUE DEPARTMENT
BULLETIN No. 77.

EFFERVESCENT SODIUM PHOSPHATE.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

OTTAWA, June 15, 1901.

SIR,—In December last, in consequence of a recommendation from Mr. A. McGill, B.A., my assistant, a collection was made of samples of Effervescent Sodium Phosphate, a medicinal preparation described in the British Pharmacopœia. Sixty-four samples were in all collected and submitted to the district analysts for examination. Their results and opinions, as well as the names of the vendors, are given in the subjoined Table No. I. It will be observed that, in this table, the column which in previous reports has been headed: 'Name and address of the manufacturer or furnisher as given by vendor,' has been altered and the table referred to: 'Name and address of manufacturer as shown by label.' This change has been made in consequence of a decision by your predecessor, to whom complaints had been made that, occasionally, some injustice had been suffered by wholesale merchants in consequence of incorrect information supplied by the parties who sold the samples.

Out of the 64 samples analyzed only 13, or 20 per cent, have been found to be genuine by the district analysts. The greater number of the adulterated samples have been so characterized, because they do not correspond with the requirements of the British Pharmacopœia.

I subjoin herewith Mr. McGill's report along with Table II. appended to it, and have to recommend the publication of the whole report now submitted.

I have the honour to be, sir,
Your obedient servant,

THOMAS MACFARLANE,
Chief Analyst.

TABLE

RESULTS of the Examination of 64 Samples

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	NAME AND ADDRESS OF	
				Vendor.	Manufacturer, as shown by Label on Bottles.
1900.			\$ cts	<i>Official Analyst, M. Bowman, Halifax, N.S. Kentville, N.S.</i>	
Dec. 26	20021	12 oz...	1 25	R. S. Masters	
				<i>Truro, N.S.</i>	
" 28	20022	12 " "	1 50	Crowe Bros.....	Parke, Davis & Co., Walkerville, Ont..
				<i>Halifax, N.S.</i>	
" 29	20023	12 " "	1 50	G. F. Colwell.....	
" 29	20024	12 " "	1 25	Buckley Bros.....	
" 29	20025	12 " "	1 50	G. A. Burbridge.....	J. Wyeth Bros., Philadelphia, U.S.A.
				<i>St. John, N.B.</i>	
" 19	17756	3 bots.	0 75	The Canadian Drug Co., Ltd., 60 Prince William St.	The Toronto Drug Company
" 20	17757	3 " "	1 50	Silas McDiarmid, King St.....	J. Wyeth Bros., Philadelphia.....
" 20	17758	12 oz...	1 20	Geo. A. Moore, 109 Brussel St..	
" 20	17759	3 bots.	0 75	Hasen J. Dick, 144 Charlotte St.	Chandler & Massey, Toronto and Montreal.
" 21	17760	12 oz...	0 75	The Canadian Drug Co., Ltd.....	
				<i>Official Analyst, Dr. M. Fleet, Quebec. Quebec.</i>	
" 19	19763	2 bots.	1 00	Laroche & Co., Fabrique St.....	H. K. Wampole & Co., Philadelphia...
" 19	19764	2 " "	1 00	W. Brunet & Co., 139 St. Joseph St.	Wyeth Bros., Philadelphia
" 19	19765	2 " "	0 50	V. Giroux, St. Peter St.....	Lyman, Sons & Co., Montreal
" 20	19766	2 " "	0 78	J. E. Livernois, Fabrique St....	Wyeth Bros., Philadelphia
" 20	19767	2 " "	0 70	J. E. Dubé, St. John St.....	Lyman, Sons & Co., Montreal
				<i>St. Hyacinthe.</i>	
" 27	19768	2 " "	1 00	Eugene St. Jacques, Cascade St..	H. K. Mulford & Co., Philadelphia and Chicago.
				<i>Sherbrooke, P.Q.</i>	
" 28	19769	1 bot...	0 50	E. C. Fraser, Commercial St....	H. K. Wampole & Co., Philadelphia...
" 28	19770	1 " "	0 50	" " " " " " " " " " " "	H. K. Mulford & Co., Philadelphia and Chicago.
" 28	19771	1 " "	1 00	W. H. Griffith, 121 Wellington St.	Wyeth Bros., Philadelphia
" 29	19772	3 lb...	1 00	J. C. Sutherland, Main St.....	
Sept. 7	19997	2 bots.	0 50	W. H. Griffith, 121 Wellington St.	

I.

of Effervescent Sodium Phosphate.

RESULTS OF ANALYSIS.						No. of Sample.	Remarks by Official Analyst.
Phosphoric Acid (P_2O_5).	Organic Acids, as Tartaric.	Citric Acid.	Soda Bicarb.		Sugar.		
			Originally present.	Under- posed.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
5.27	50.25	.....	30.21	.....	.....	20021	Below standard in sodium phosphate.
8.02	48.57	.....	35.39	.....	.....	20022	"
7.85	42.37	.....	41.98	.....	.....	20023	"
5.63	51.15	.....	37.59	.....	.....	20024	"
5.63	49.68	.....	39.00	.....	.....	20025	"
4.12	45.37	.....	46.39	.....	.....	17756	"
5.36	52.29	.....	38.90	.....	.....	17757	"
8.32	42.56	.....	40.80	.....	.....	17758	"
5.92	44.44	.....	43.73	.....	.....	17759	"
4.97	43.31	.....	46.75	.....	.....	17760	"
8.69	45.00	Present.	50.32	33.02	.....	19763	Genuine.
6.01	49.87	"	49.66	33.06	.....	19764	Somewhat low in sodium phosphate, otherwise good.
1.53	35.00	"	35.52	24.43	.....	19765	Much below the B. P. standard.
6.14	50.25	"	50.46	24.93	.....	19766	Rather low in sodium phosphate, otherwise good.
3.00	35.25	"	35.70	20.52	.....	19767	Much below the B. P. standard.
15.85	33.44	"	29.94	23.29	.....	19768	Very high in sodium phosphate.
9.02	47.10	"	51.91	25.39	.....	19769	Genuine.
15.70	36.38	"	28.90	21.67	.....	19770	Very high in sodium phosphate.
6.14	50.02	"	50.10	35.08	.....	19771	Rather low in sodium phosphate, otherwise good.
4.16	46.25	"	47.40	29.40	.....	19772	Below B. P. standard in sodium phosphate.
2.81	53.55	.....	36.63	.....	.....	19967	Adulterated, being greatly below the B. P. standard in sodium phosphate.

77-11

TABLE

RESULTS of the Examination of 64 Samples of

Date of Collection.	Number of Sample.	Quantity purchased.	Cost.	NAME AND ADDRESS OF	
				Vendor.	Manufacturer, as shown by Label on Bottle.
1900.			8 cts.	<i>Official Analyst, Dr. F. X. Valade, Ottawa.</i>	
				<i>Montreal.</i>	
Dec. 14	19753	6 oz....	0 50	H. Lebeau, 406 St. James St....	
" 14	19754	"	0 50	John T. Lyons, 2 Bleury	
" 14	19755	2 bots..	0 50	L. A. Bernard, 1882 St Catherine St.	Lyman, Sons & Co., Montreal.....
" 17	19756	6 oz....	0 60	J. H. Charron, 1978 Notre Dame St.	
" 18	19757	2 bots..	0 75	Leeming, Miles & Co., St Sul- pice St.	Alfred Bishop Co., London, England ..
" 18	19758	1 bot ..	1 00	Kerry Watson & Co., St. Paul St.	
" 18	19759	5 oz....	0 50	T. E. Huot, St. Catherine St....	
" 18	19760	2 bots..	0 75	Parke, Davis & Co., St. Paul St.	Vendors ..
" 18	19761	" ..	0 83	Davis, Lawrence & Co., St. An- toine St.	Wyeth Bros., Philadelphia.....
"	19762	" ..	0 70	Evans & Sons, St. Jean Baptiste.	
				<i>Ottawa.</i>	
Sept. 1	20763	8 oz....	0 50	G. Kennedy, Druggist.....	
				<i>Toronto.</i>	
Dec. 21	20801	8 oz....	0 75	F. W. McLean, 121 Church St...	'Whites,' Queen City Drug Co., Agents.
" 21	20802	"	0 25	J. F. Taylor, 144 Queen E.	Lyman Bros. & Co., Toronto.....
" 21	20803	"	0 60	R. Robinson, 216 Queen E.	
" 21	20804	"	0 35	G. A. Bingham, 100 Yonge St...	H. K. Wampole & Co., Philadelphia..
" 21	20805	"	0 30	G. C. Harbottle, 135 King W....	
" 21	20806	"	0 50	Burgess, Powell & Co., Yonge St.	Wyeth Bros., Philadelphia.....
				<i>Peterborough.</i>	
" 22	20807	"	1 00	Ormond & Walsh, Druggist.....	H. K. Mulford & Co., Philadelphia....
" 22	20808	"	1 00	W. Madill, Druggist.....	Wyeth Bros., Philadelphia
" 22	20809	16 oz....	0 80	H. H. Edmison, Druggist.....	
" 22	20810	10 oz....	0 50	J. Nugent, Druggist.....	
Sept. 6	20777	12 oz....	1 00	J. D. Tully, Druggist.....	Wyeth Bros., Philadelphia.....
				<i>Official Analyst, F. T. Harrison, London, Ont.</i>	
				<i>Stratford, Ont.</i>	
Dec. 18	19424	12 oz....	1 00	E. C. Nasmyth	Parke, Davis & Co
" 18	19425	12 " ..	1 00	H. W. Thomson	W. H. Allen, Windsor, Ont.
				<i>London, Ont.</i>	
" 18	19426	12 " ..	1 00	Cairncross & Lawrence, 216 Dun- das St.	
" 18	19427	12 " ..	0 80	C. McCallum & Co., cor. Rich- mond St.	

I—Continued.

Effervescent Sodium Phosphate—Continued.

RESULTS OF ANALYSIS.						Number of Sample.	Remarks by Official Analyst.
Phosphoric Acid (P_2O_5 .)	Organic Acids, as Tartaric.	Citric Acid.	Soda Bicarb.		Sugar.		
p. c.	p. c.	p. c.	Originally present.	Undecom- posed.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	p. c.	
4.80	43.86	Present.	40.13				19753 Below standard in phosphates and carelessly com- pounded.
5.05	43.46	"	48.70				19754 Not up to standard in phosphates and carelessly com- pounded.
1.50	42.82	"	47.06				19755 Adulterated, being much too low in phosphates.
4.50	38.24	"	42.83				19756 Adulterated, being low in phosphates.
4.37	40.86	"	45.77				19757 Below standard, being low in phosphates. Sample care- lessly compounded.
7.30	40.49	"	45.38				19758 Genuine.
2.50	36.37	"	40.73				19759 Adulterated. Much too low in phosphates.
9.20	41.79	"	48.71				19760 Good.
5.65	38.99	"	43.07				19761 Below standard. Sample carelessly compounded.
9.30	40.31	"	45.16				19762 Genuine, but carelessly compounded.
3.98	29.31	12.97	45.25				20762 Good
4.86	38.85	Present.		27.29			20801 Adulterated.
2.83	35.35	"		22.13			20802 " "
9.73	50.60	"		30.53			20803 Unadulterated.
9.38	51.76	"		27.56			20804 " "
5.17	52.36	"		31.07			20805 Adulterated.
6.10	57.25	"		33.78			20806 " "
17.06	12.49	"		24.33			20807 Contains an excess of phosphoric acid, therefore adul- terated.
6.45	24.24	"		35.69			20808 Adulterated.
8.15	55.53	"		15.93			20809 " "
5.07	46.26	"		32.73			20810 " "
6.14	48.65	"		36.85			20777 Not genuine.
9.72	47.96	Present.	50.97				19424 Genuine.
36.36	None	None	40.20				19425 Adulterated, not being made according to the B. P.
10.36	46.07	Present.	49.20				19426 Genuine.
5.12	42.10	"	44.60				19427 Adulterated.

TABLE

RESULTS of the Examination of 64 Samples

Date of Collection.	No. of Sample.	Quantity purchased.	Cost.	NAME AND ADDRESS OF	
				Vendor.	Manufacturer as shown by Label on Bottles.
1900.			\$ cts.	<i>Windsor, Ont.</i>	
Dec. 19	19429	12 " ...	0 60	A. Wilkinson.....	Toronto Drug Co.....
				<i>London, Ont.</i>	
" 20	19430	12 " ...	0 60	C. Symmonds, 468 Dundas St.....	
" 20	19431	12 " ...	0 40	W. E. Saunders	
" 20	19432	12 " ...	0 60	N. J. McDermid, Dundas St.....	
" 20	19433	12 " ...	0 60	J. Callard, Richmond St.....	
Sept. 7	19389	2 bots ..	0 40	C. McCallum, druggist	
				<i>Official Analyst, E. B. Kenrick.</i>	
				<i>Winnipeg.</i>	
				<i>Ottawa.</i>	
Dec. 10	20793	8 oz....	0 50	J. J. Allen, Bank St.....	Toronto Drug Co.....
" 10	20794	10 " ...	0 35	G. Watson, Bank St.....	
" 10	20795	4 " ...	0 50	Kirby Bros.....	
" 10	20796	8 " ...	0 40	J. J. Allen, Bank St.....	
" 10	20797	6 " ...	0 45	S. J. Stevenson, Elgin St.....	
" 10	20798	8 " ...	0 75	A. E. Brethour, Bank St.....	
" 10	20799	8 " ...	0 40	Skinner & Co., Wellington St.....	
" 10	20800	5 " ...	0 50	J. J. Allen, Bank St.....	Wyeth Bros., Philadelphia.....
				<i>Winnipeg.</i>	
Oct. 1	17271	1 bot..	1 00	W. J. Mitchell.....	
				<i>Official Analyst, Dr. C. J. Fagan,</i>	
				<i>Victoria, B.C.</i>	
				<i>Vancouver, B.C.</i>	
" 20	21524	1 lb ...	0 75	J. K. Seymour.....	
1901.				<i>Victoria, B.C.</i>	
Jan. 22	21545	3 bots ..	1 50	Davis Bros.....	

I—Continued.

of Effervescent Sodium Phosphate—Concluded.

RESULTS OF ANALYSIS.						No. of Sample.	Remarks by Official Analyst.
Phosphoric Acid (P_2O_5).	Organic Acid, as Tartaric.	Citric Acid.	Soda Bicarb.		Sugar.		
			Originally present.	Undecom- posed.			
p. c.	p. c.	p. c.	p. c.	p. c.	p. c.		
5.25	41.65	" ..	43.20	.....	.....	19429	Adulterated.
9.34	44.40	" ..	48.60	.....	.....	19430	Genuine.
5.50	41.58	" ..	43.20	.....	.....	19431	Adulterated.
6.14	45.13	" ..	48.3	.....	.....	19432	"
4.22	42.61	" ..	44.80	.....	.....	19433	"
3.56	44.50	" ..	.....	.....	12.14	19389	Not made according to B. P. and is therefore adulterated.
4.17	35.72	9.89	47.03	.....	7.42	20793	Not in accordance with formula of B. P.
3.13	38.87	10.58	50.14	.....	7.29	20794	"
10.05	27.40	18.88	50.54	.....	.....	20795	Genuine.
.....	18.71	13.08	37.14	.....	11.09	20796	Adulterated. Contains magnesium sulphate in the place of sodium phosphate.
10.71	24.60	16.54	42.85	.....	.....	20797	Genuine.
9.41	23.32	20.12	44.40	.....	.....	20798	"
2.22	19.52	14.64	35.43	.....	29.41	20799	Adulterated.
4.83	14.69	33.30	49.97	.....	.....	20800	Not in accordance with the formula of the B. P.
9.67	41.64	.....	30.01	.....	.....	17271	Has lost about 36 per cent of its carbon dioxide through keeping.
25.94	None.	.....	.....	.....	.....	21524	A phosphate of soda.
5.56	32.25	Present.	.....	28.56	.....	21545	Effervescing phosphate of soda.

LABORATORY OF THE INLAND REVENUE DEPARTMENT,
OTTAWA, June 1, 1901.

THOS. MACFARLANE, Esq., F.R.S.C.,
Chief Analyst.

SIR,—On November 16 last, I submitted to you a preliminary report upon a few samples of Effervescing Phosphate of Soda, and two somewhat similar, but proprietary, articles, viz: Abbey's Effervescent Salt and Eno's Fruit Salt. On account of the large differences found between *Sodii Phosphas Effervescens* as occurring on the market, and as defined by the British Pharmacopœia, I recommended that a considerable number of samples should be subjected to examination, and I have now the honour to furnish herewith a report upon the whole number (64) analyzed.

I have the honour to be, sir,

Your obedient servant,

A. MCGILL.

Sodii Phosphas Effervescens, or Effervescent Phosphate of Soda.

The British Pharmacopœia prescribes the following formula and mode of preparation for this article:—

Sodium phosphate, crystals	50 parts.
“ bicarbonate (powder)	50 “
Tartaric acid	27 “
Citric acid	18 “
	145 “

The crystals of sodium phosphate are directed to be dried to loss of 60 per cent of their weight. Since this salt contains 60·3 per cent of water of crystallization, this means the practical dehydration of it. The bicarbonate of soda and the tartaric acid are normally anhydrous. The citric acid contains one molecule of water, = 8·7 per cent of its weight. Calculated to dry materials the quantities named above become as follows:—

50 parts cryst. sod. phos =	20 pts. anhydrous.
50 “ bicarb. soda =	50 “ “
27 “ tartaric acid =	27 “ “
18 “ citric acid =	16·4 “ “
145 “	113·4 “ “

After mixing the ingredients, the mixture is directed to be further dried so as to weigh about 100 parts. Assuming this further loss to consist solely of carbonic acid gas, resulting from the conversion of

bicarbonate of soda into mono-carbonate, the final product should consist of:—

Anhydrous sodium phosphate.....	20 per cent.
Bicarbonate of soda.....	16 "
Mono-carbonate of soda.....	22 "
Tartaric acid.....	27 "
Anhydrous citric acid.....	16 "
	100

Corresponding to:—

	P. C. organic acids.	Na ₂ O	P ₂ O ₅	CO ₂	H ₂ O
HNa ₂ PO ₄	20	= 8.73	+ 10.00	..	+ 1.27
HNa CO ₃	15	= 5.54	.....	+ 7.90	+ 1.56
Na ₂ CO ₃	22	= 12.87	.....	+ 9.13	+
H ₂ C ₄ H ₄ O ₆	27	.....	.....	.....	.....
O ₂ H ₂ OH (CO ₂ H) ₂	16	.....	.....	.....	.....
	100	43	27.14	10.00	17.08
					2.83

Analysis should therefore give:

Total organic acids (as tartaric acid).....	43.0 per cent.
Phosphoric acid (as P ₂ O ₅).....	10.0 "
Soda (as Na ₂ O).....	27.14 "
Carbonic acid gas (CO ₂).....	17.08 "
Water (H ₂ O).....	2.83 "
	100.00 "

It is not, however, conceivable that the process of drying the mixture brings about no further chemical changes than are here supposed. On the contrary, it is probable that loss of carbonic acid is, to some extent, brought about by interaction between the organic acids and the bicarbonate of soda, thus forming sodium citrate and tartrate. It is further certain that more or less alteration in composition must result from the separation of the product by sieves into granules of 'uniform and convenient size,' as directed by the pharmacopoeia. Besides this, it is inevitable that a gradual reaction should go on between the free acids and the carbonate of soda, during the time that the article is kept in stock. Most of the samples found on the market are very carefully put up by the manufacturers, in order to prevent, as much as possible, deterioration of the kind just referred to; but absolute prevention of it is probably impossible.

This preparation is evidently intended as a pleasant means of administering sodium phosphate, and it occurs for the first time in the British Pharmacopoeia of 1898. It is not mentioned in the United States Pharmacopoeia of 1890. The most important component of the effervescent phosphate is therefore the contained phosphate of soda. In proportion as weight is lost through interaction of free organic acid with bicarbonate of soda, the percentage weight of phosphate of soda will increase. As I have already shown, a freshly prepared sample of *sodii phosphas effervescentes* should contain 10 per cent of its weight of P₂O₅. On keeping such a sample sufficiently long for the whole of the bicarbonate to have reacted with the organic acids (which are in slight excess of the weight required to decompose the whole of the bicarbonate:—

$$\begin{aligned} \text{H}_2\text{C}_4\text{H}_4\text{O}_6 : 2\text{HNaCO}_3 &:: 150 : 168 = 27 : 30.2 \\ \text{H}_2\text{C}_6\text{H}_8\text{O}_7 : 3\text{HNaCO}_3 &:: 192 : 252 = 16 : 21.0 \\ &= 43 : 51.2 \end{aligned}$$

the article will have lost 17 per cent of its original weight, and the phosphoric acid will now constitute more than 12 per cent, by weight of it. Hence it is reasonable to demand that commercial samples of effervescent phosphate of soda shall contain phosphoric acid correspond-

ing approximately to at least 10 per cent of P_2O_5 . Of the 64 samples analysed, three—viz: 19,425, 20,796 and 21,524 are not effervescent phosphate. The remaining 61 show the following results, so far as phosphoric acid is concerned:—

Less than 2 per cent P_2O_5			2 samples
"	3	"	4
"	4	"	4
"	5	"	10
"	6	"	13
"	7	"	7
"	8	"	2
"	9	"	4
"	10	"	9
"	11	"	3
"	18	"	3

61

Three samples contain a decided excess of phosphoric acid, viz:—19,768, 19,770 and 20,807. These are made by an American firm.

Alkaline citrates and tartrates are possessed of purgative properties, and it is not impossible that the citrate and tartrate of soda present in excess, in most of the above samples which show a deficiency of phosphate, may efficiently replace the latter, so far as medicinal properties are concerned. Indeed the dose of Sodii Citro-tartras Effervescens (B.P.) is identical with that prescribed for Sodii Phosphas Effervescens. This preparation contains about 15 per cent of sugar, and the presence of sugar in certain of the samples collected as phosphate of soda, and containing low percentages of phosphate, would seem to imply a confusion of the two preparations. But it should be evident to manufacturers and dealers that the two substances referred to, are quite distinct, and that the purchaser of Sodium phosphate is entitled to receive the article, he asks for, and not a substitute for it. If such samples as 20,793, 20,794 and others, containing sugar, be sold as phosphate of soda, they are adulterated, within the meaning of the Act; while if sold as Effervescent Sodium Citro-tartrate, they are adulterated, as containing phosphate of soda. It is not, however, to be understood that any blame attaches to those manufacturers who have, up to this time, placed on the market an article of effervescing phosphate of soda, containing less (or more) than 10 per cent of P_2O_5 . As has already been mentioned, the preparation appears for the first time in the 1898 edition of the British pharmacopœia, and is not contained at all in the United States pharmacopœia. Manufacturing druggists were much in advance of the pharmacopœias and in manufacturing from private formulas they naturally uttered an effervescing phosphate of variable character. Many of the samples, whose analysis is here given, were doubtless in the hands of dealers before the preparation became official in 1898. Now, however, that effervescing phosphate of soda has been authoritatively defined it will be required of those who furnish it under its specific name that they should supply the British pharmacopœia article.

In sample 21,524, phosphate of soda has been supplied instead of the effervescent phosphate. Sample 20,796 is made up with Magnesium sulphate, and is consequently adulterated within the meaning of the Act. No. 19,425 contains no citric nor tartaric acid, and consists of acid phosphate with carbonate of soda. Of course this also constitutes adulteration.

In analysis, the estimation of phosphoric acid is effected by any of the recognized methods, and presents no difficulties. The organic acids present are conveniently estimated together by permitting complete reaction to take place, in solution, between the free acids present and the bi-carbonate of soda—with addition of a standard soda solution to exact neutralization. Of course, if the soda is already present in excess, sulphuric acid must be added in excess, carbonic acid boiled off, and the resulting solution carefully neutralized. On evaporating to dryness and charring, the organic acids furnish an equivalent amount of carbonates, from which they may be calculated as tartaric acid without much error. It is necessary to make at least a qualitative test for citric acid, since this has a higher market value than tartaric, and in cases where judged desirable it may be well to estimate the tartaric acid directly as acid potassium salt.

The carbonate of soda existing as such may be estimated by determining the carbonic acid gas liberated by solution in water—with addition of acid, if necessary. This estimation gives an idea of the extent to which deterioration of the article by keeping has taken place.

The original bi-carbonate of soda present is calculated from the same data which furnish the total organic acids. Of course, where considerable deterioration has taken place, the expressing of *original* bi-carbonate of soda, as a percentage on the sample purchased, will give a number much in excess of the fact, and will cause the sum of phosphate soda, organic acids and (original) bi-carbonate soda to add to more than 100. The maximum error that may result from this mode of expressing results may be about 15 to 20 per cent. In the accompanying table II., this is the interpretation to be put upon the numbers larger than 100 in the column headed 'Sum.' Where the number contained in this column is considerably less than 100, it is probably because sugar, or other component, has not been estimated. Where the number is exactly 100, it means that one of the components has not been directly estimated, but expressed by difference. It is probable that the bi-carbonate of soda is so expressed; and, in this case, the number given would stand for residual bi-carbonate of soda, and will include sugar, etc., if present. It will be seen that Mr. Bowman has returned his analytical results in this way.

TABLE II.—EFFERVESCING PHOSPHATE OF SODA.

Serial Number.	Departmental Number.	Phosphoric Acid. (P ₂ O ₅ .)	Organic Acids—(as Tartaric.)	Bi-carbonate Soda. (HNa CO ₃ .)	Phos. Soda. Calculated. (HNa ₂ CO ₄)	Sum.	Sugar.	Remarks.	Analyst.
1	17756	4.12	45.37	46.30	8.24	100.00	.....	Bi-carbonate soda by difference.	Bowman.
2	17757	5.36	52.29	36.99	10.72	100.00	.....	"	"
3	17758	8.32	42.56	40.80	16.64	100.00	.....	"	"
4	17759	5.92	44.44	43.72	11.84	100.00	.....	"	"
5	17760	4.97	43.31	46.75	9.94	100.00	.....	"	Harrison.
6	18424	9.72	47.96	50.97	19.44	118.57	.....	"	"
7	19425	36.36	46.07	40.20	20.72	115.99	.....	"	"
8	19426	10.36	42.07	49.20	10.24	98.94	.....	"	"
9	19427	5.12	.....	44.60	.....	.....	.....	"	"
10	19428	.....	41.65	43.30	10.50	95.35	.....	"	"
11	19429	6.25	44.40	48.60	18.68	111.68	.....	"	"
12	19430	9.34	41.58	43.20	11.00	96.78	.....	"	"
13	19431	5.50	45.13	48.30	12.28	107.71	.....	"	"
14	19432	6.14	42.61	44.80	8.44	96.85	.....	"	"
15	19433	4.22	43.86	49.13	9.60	102.69	.....	"	"
16	19753	4.80	43.48	48.70	11.30	103.48	.....	"	Valade.
17	19754	5.65	42.82	47.96	3.00	93.78	.....	"	"
18	19755	1.60	38.24	42.83	9.00	90.07	.....	"	"
19	19756	4.50	40.86	45.77	8.74	95.37	.....	"	"
20	19757	4.37	40.49	45.38	14.40	100.27	.....	"	"
21	19758	7.20	36.37	40.73	5.00	82.10	.....	"	"
22	19759	2.50	41.79	48.71	18.40	106.90	.....	"	"
23	19760	9.20	38.99	43.67	11.30	93.96	.....	"	"
24	19761	5.65	40.31	45.15	18.60	104.66	.....	"	"
25	19762	9.30	45.00	50.32	17.38	112.70	.....	"	Finet.
26	19763	8.69	49.87	49.68	12.62	110.57	.....	"	"
27	19764	6.01	38.06	38.53	3.06	73.65	.....	"	"
28	19765	1.83	50.25	50.48	12.28	113.01	.....	"	"
29	19766	3.00	35.25	35.70	6.00	76.95	.....	"	"
30	19767	15.85	30.44	29.94	31.70	92.08	.....	"	"
31	19768	9.02	47.10	51.91	18.04	117.05	.....	"	"
32	19769	15.70	36.38	28.90	21.40	96.68	.....	"	"
33	19770	4.16	50.02	50.10	12.28	112.40	.....	"	"
34	19771	4.16	46.35	47.40	8.32	102.07	.....	"	"
35	19772	5.27	50.25	39.21	10.54	100.00	.....	Bi-carbonate soda by difference.	Bowman.
36	20021	8.02	48.57	35.39	16.04	100.00	.....	"	"
37	20022	7.86	42.37	41.93	15.70	100.00	.....	"	"
38	20023	5.63	51.15	37.59	11.26	100.00	.....	"	"
39	20024	5.63	49.68	39.06	11.26	100.00	.....	"	"
40	20025	5.63	49.68	39.06	11.26	100.00	.....	"	"

Appendix.—At the same time that the first collection of Effervescent Phosphate of Soda was made, a few samples of two much advertised preparations, believed to have somewhat similar aperient properties, were obtained and analysed, I refer to Eno's Fruit Salt and Abbey's Effervescent Salt.

Eno's Fruit Salt (No. 20,778).—This sample was analysed by Dr. Ellis, in October, 1900.

The following are his results :—

Sodium Bi-carbonate	50·01 Per cent.
Citric acid	47·11 "

Abbey's Effervescent Salt No. 17,372 (Kenrick), No. 19,388 (Harrison).

Sulphuric acid (SO_3)	1·60
Magnesia MgO	0·86
Calculated to Epsom Salts.....	5·29
Potash (K_2O)	1·61
Soda Na_2O	13·58
Calculated to bi-carb.....	36·80
Carbon dioxide	18·67
Chlorine in Chlorides	9·07
Cane sugar	12·34
Tartaric acid	40·45
	53·70
	19·83
	15·28
	39·75

The important feature of each preparation is the development, by solution of an alkaline citrate or tartrate, and they resemble in many respects the Sodii Citro-Tartras effervescens of the British Pharmacopœia.

A. McG.